

MEMOIRS
OF THE
GEOLOGICAL SURVEY
OF
THE UNITED KINGDOM.

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*Figures and Descriptions*

ILLUSTRATIVE OF  
BRITISH ORGANIC REMAINS.

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DECADE V.  
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BRITISH FOSSILS.

DECADE THE FIFTH.

IN apologizing for the unavoidable delay which has taken place in the publication of this Decade, owing to the much lamented decease of Professor Edward Forbes, it is right to state that the materials left behind by him were scanty, and had been unfortunately mislaid a short time before his death. The first description only, that of *Solaster Moretonis*, had been fully written by him; of the others, we had here and there notes on the distinctive characters of the species, and of his views as to their synonymy or history. The plates, however, had been all engraved under his own eye, and the specific designations under which he wished the figures to stand, were recorded in the last edition of Morris's Catalogue. He had there also applied MS. names to a number of species to be described in the Decade.

In a few cases only it has been found necessary to alter some of these names; and this has been done in deference to an authority which would have been gladly admitted by Professor Forbes. To Mr. S. P. Woodward, of the British Museum, we are indebted for all the notes respecting these supplementary species; and he has also furnished full descriptions of three of the plates. With this valuable aid, and the friendly communications of Dr. T. Wright, of Cheltenham, we can present the Decade in nearly as complete a form as it would have possessed had our friend and Master lived to finish it. We miss, however, his lively remembrance of the living species, and his practical acquaintance with their variations,—deficiencies not to be supplied by reference to his published works.

Of the ten species figured three are new,—*Solaster Moretonis*, *Cidaris Carteri*, and *Pygaster conoideus*. Of the other genera, *Diadema*, *Echinopsis*, and *Echinus* present us with well-known types from the Oolitic rocks, which are continental as well as British. *Pyrina* is a rare genus in England, and in this, and the two figured species of *Pygaster*, we have excellent examples of that division of the *Cassidulidae* in which the ambulacra are of uniform character throughout. Several genera of this type have been figured in the Decades. The *Pygaster semisulcatus* is a critical species, and its synonymy is now for the first time cleared up. *Hemiaster Murchisonia* is another instance of the same kind, and belongs to a large genus of closely allied species. The *Brissus Scillæ* is a Crag species still existing in the Mediterranean. None of these nine genera have before appeared in the Decades.

There are engraved plates sufficient for another fasciculus, upon which Professor Forbes left no memoranda, except the names of the species. These Plates will be published at a future period.

JOHN W. SALTER,
Palæontologist.

Geological Survey Office, Jermyn Street, London,
February 1856.

BRITISH FOSSILS.

DECADE V. PLATE IX.

HEMIASTER MURCHISONIÆ.

[Genus HEMIASTER. DESOR, 1840. (Sub-kingdom Radiata. Class Echinodermata. Order Echinidæ. Family Spatangaceæ.) Body obtusely cordate, tumid; dorsal ambulacra dissimilar, petaloid, lodged in depressions, and surrounded by a simple peripetal fasciole; tubercles of the dorsal surface small and similar; anus terminal, supra-marginal; no sub-anal fasciole; mouth eccentric, bilabiate.]

DIAGNOSIS. *H. corpore tumido, ambitu subcordato; ambulacris dorsalibus profundis, postero-lateralibus brevissimis; fasciolâ latâ, evanescente.*

SYNONYMS. *Spatangus*, SMITH, Strat. Syst., p. 37. fig. 3., 'Brickearth' plate. *Hemiaster inæqualis*, FORBES, MS. in Morris's Cat. 2nd edit. p. 81. (not *Brissus inæqualis*, Forbes, Pondicherry Fossils, 1846, Trans. Geol. Soc. t. 7. p. 160. pl. 19. f. 6.) *Hemiaster inæqualis*, AG. and DESOR, Cat. 1847, p. 2. D'Orb. Prod. iv. p. 329.) *Micraster Murchisoni*, MORRIS, Cat., 1st edit. 1843, p. 55. BRONN, Index, p. 724. *Spatangus Murchisonianus*, MANTELL, 1835, Geol. Tr. 2nd ser. v. 3. p. 210, in part. DESMOULINS, Ech., p. 412. (not *Echinospatangus Murchisoniæ*, KÖNIG, Icones, 169. unpublished.)

A memorandum in the handwriting of Professor Forbes suggests that this species might possibly be included in the group of Cretaceous urchins figured (but not yet described) by M. d'Orbigny, under the name *Epiaster*, and distinguished by the absence of any fasciole. The species of *Epiaster*, however, are rather to be regarded as *Micrasters* wanting the sub-anal fasciole, and in this group should be included the *Micraster cor-anguinum*, var. *gibbus*, of Decade III. pl. 10, f. 11, 12.

The specific name is applied in the belief that this is identical with the *Spatangus Murchisoniæ* of collectors, found in the upper Green Sand of Nurstead and Devizes, although not the species figured by König, which is nothing more than a crushed specimen of *Holaster levis*.

Description.—The typical specimen (*a*) is extremely tumid, much more so than is represented (f. 3 and 4) in the plate. The measurements and number of ambulacral pores are accurately stated in the following memorandum by Professor Forbes :—

"In the British Museum are three specimens of this species from Blackdown. They differ from each other considerably in form, and in degree of depth of the dorsal ambulacra."

		A.		B.		C.
Length	-	$1\frac{8}{12}$	-	$1\frac{1}{12}$	-	$1\frac{1}{24}$
Breadth	-	$1\frac{8}{12}$	-	$1\frac{2}{12}$	-	1
Height	-	$1\frac{3}{12}$	-	$0\frac{1}{12}$	-	$0\frac{8}{12}$
Anterior ambulacra (pores)		28 pairs		26	-	24
Antero-lateral	-	43	-	36	-	30
Postero-lateral	-	20	-	22	-	16

The specimen B. is apparently adult, but dwarfish; and C. is a very young individual with the ambulacra but slightly impressed.

In the larger specimen the vertex is considerably behind the centre; the dorsal ambulacra are deeply impressed; the anterior sulcus becomes shallow at the margin, and is prolonged to the bilabiate mouth; the posterior end is slightly flattened, and nearly vertical; whilst in the smallest specimen it slopes at an angle of 73° . The vent is high up, small, and elliptical; the plates on each side of it have slight central prominences, converging to the caudal protuberance, beyond which on each side is a moderately projecting lateral boss.

The anterior ambulacral hollow is wide, finely granulated and tuberculate; the pairs of pores are separated by distinct tubercles. The lateral grooves are nearly smooth; the antero-lateral pair are shorter than the odd ambulacrum, and doubly curved; the posterior pair are less than half the length of the front pair. The spaces between the petals are pinched up near the apical disk, and more densely and roughly tuberculated.

The apical disk is composed of four perforated genital plates, of which the *right** antero-lateral includes the madreporiform body; there are five perforated ocular plates.

The surface of the test is very finely granulated above, with few scattered tubercles in the peripetal zone; the tubercles are more numerous and regularly distributed on the sides, becoming larger towards the base.

Affinities.—In its contour, and the form and proportions of its dorsal ambulacra, the *Hemiaster Murchisoniae* agrees with the

* Incorrectly stated to be the *left* in the description of *Micraster cor-anginum*, Decade III.

typical species of the genus, and especially with the *H. Bailyi* of the Gault of Folkstone, from which it is only distinguishable by the absence of any proper fasciole. In *H. Bailyi*, the peripetal fasciole is narrow and distinct, being more finely granulated than the adjacent surfaces, although a very few tubercles are found encroaching upon it. In *H. Murchisoniæ* there is a very wide space surrounding the ambulacral petals, over which tubercles are more thinly scattered; the miliary granules in this band appear scarcely finer than over the rest of the surface, but this may be partly due to the condition of the specimens, which though silicified are slightly weathered. Ten specimens have been examined.

Locality and Formation.—At present this species is only known to occur in the GREEN SAND of Blackdown, Devon, where it is the only urchin of frequent occurrence.

DESCRIPTION OF THE PLATE.

- Fig. 1. Upper view (of specimen in the British Museum).
- Fig. 2. Under side of same specimen.
- Fig. 3. Terminal view (of a more depressed example).
- Fig. 4. Lateral view; the outline indicates the profile of specimen represented by figs. 1, 2. This figure (4) is represented as much too depressed, probably from being crushed, the dotted lines represent it more truly.
- Fig. 5. Apical disk magnified.
- Fig. 6. Details of the ambulacra.
- Fig. 7. Anterior ambulacrum magnified.
- Fig. 8. Portion of the surface adjoining the right postero-lateral ambulacrum, magnified to show the diffused condition of the fasciole.
- Fig. 9, 10. Tubercles of the lateral surfaces magnified.

Note on other British species of Hemiaster.

In addition to the *Hemiaster inæqualis*, Mr. Morris enumerates the following as species to be described by Prof. Forbes in the Fifth Decade :

Hemiaster asterias, Gault, Folkstone.

H. Bailyi, Gault, Folkstone.

H. Morrisii, Chalk Marl, Dover.

1. *Hemiaster asterias*, Forbes, Morris's Catal., 2nd edit. 81.

The specimens with this name attached are not in a sufficiently well-preserved state to admit of exact comparison and description (the best example being at Edinburgh, and at present inaccessible). The vertex appears to have been more prominent and further back than in the species figured, or in *H. Bailyi*, and the dorsal ambulacra may be longer and narrower in proportion.

Locality.—GAULT, Folkstone. (Mus. Pract. Geology.)

2. *H. Baillyi*, Forbes, MS. Morris's Cat., 2nd edit. p. 81. *Holaster argillaceus* (part), Morris's Cat., 1st edit. p. 54. *Echino-spatangus*, Mantell, Geol. Sussex, p. 86.

The specimens of this *Hemiaster* are all more or less crushed, but the most perfect agree in their proportions with the figured specimens of *H. Murchisonie*. One example, of the size of the figure, has the same number of ambulacral pores as specimen B., viz. 26, 36, 22. The *peripetal fasciole* is quite distinct, narrow, and simple in its contour, passing from end to end of the ambulacral petals, and only slightly contracted at the sides. The surface of the Gault urchins is usually rough, with nodular concretions of iron pyrites formed upon the tubercles. So many of the Blackdown fossils are identical with species of the Folkstone Gault, that we have felt considerable hesitation in admitting as specific, a character which may by any possibility be due to the mineral condition of the specimens.

Locality.—GAULT, Folkstone.

3. *H. Morrisii*, Forbes, MS. Morris's Cat., 2nd edit. p. 81. *Echinospatangus cordiformis* (part), Mantell, Geol. Sussex, p. 108. *Hemiaster punctatus*, D'Orb. Ter. Cret., pl. 886. ? (no description). *Spatangus complanatus*, Mantell, Medals, 1st edit. p. 355. (not figured).

This not uncommon species has been long known to English collectors by a variety of incorrect names, but it is entirely distinct from any species with which we have been able to compare it, except the *Hemiaster punctatus* of D'Orbigny, the description of which has not yet appeared. The largest specimen of Dr. Mantell's measures in length $2\frac{3}{8}$, breadth 2, height, $1\frac{3}{8}$ inches. One of ordinary dimensions measures lon. 17, lat. 16, alt. 10 lines. The outline is oval and slightly polygonal; the anterior sulcus broad and obscure; the posterior end flat, and sloping at an angle of 70° (not vertical as in *H. punctatus*). The under side is but slightly flattened, the margins tumid, the vertex depressed and central. The ambulacral petals are small, moderately impressed, and surrounded by a distinct fasciole, which passes from point to point with scarcely any curvature. The surface, when well preserved, is rough with unequal tubercles, which are perforated, seated on crenulated bosses, and surrounded by a sharply-defined plain ring; they are so crowded as seldom to allow the formation of a complete circle of miliary granules.

Localities.—LOWER CHALK, Dover (Mus. Pract. Geol.) and Hamsey, Sussex (Brit. Mus. Mantellian Collection).

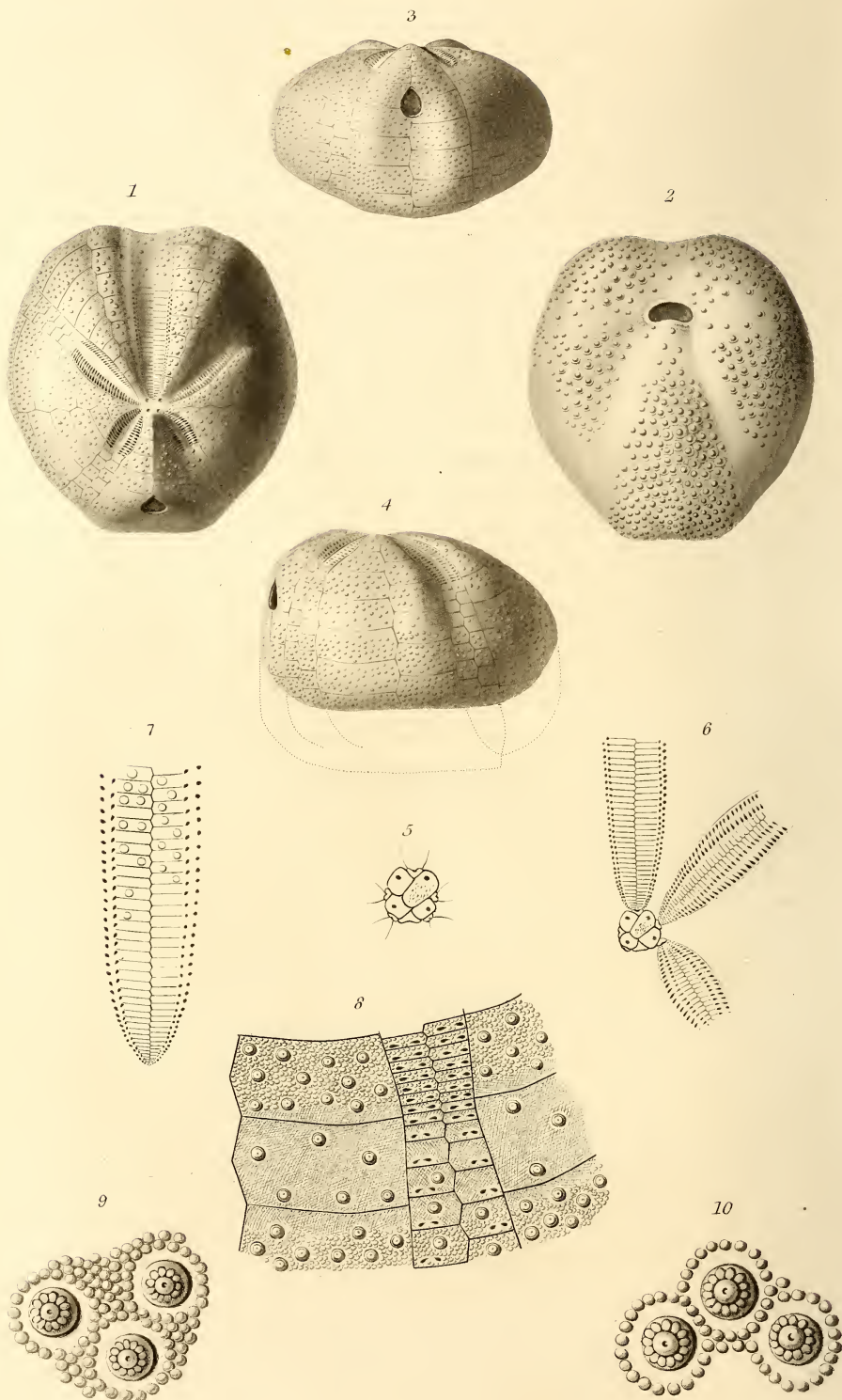
4. *H. bucardium*, Goldf. sp. (sec. Bronn, Index, p. 723.) *Micraster lacunosus*, Morris's Cat., 1st edit. p. 55. (not Parkinson).

This fine species is omitted in the second edition of the Catalogue of British Fossils; it agrees very well with the figures of Goldfuss. In the British Museum there is a single specimen of another species, equalling *H. bucardium* in size, and apparently undescribed.

Locality.—UPPER GREEN SAND, Warminster.

S. P. WOODWARD.

March 1856.



HEMIASTER MURCHISONI — *Mantell*.